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LUMINARY Memo #131

To: Distribution
From: Dana Densmore
Date: 2 January 1970
Subject: LUMINARY Revisions 132-135

The following changes were incorporated into Revisions 132-135:

1) (PCR 892) R29 was deleted. This involved the following changes.
a) Flagwords OLDESFLG and NOR29FLAG were deleted (made
spares) and READRFLG, which was equivalent to R04FLAG, was
deleted, leaving R04FLAG using that bit. Comments on the use
of LOSCMFLG in R29 were removed.

b) STARTSB2 was changed to not clear READRFLG for R29 and
not do special setting of RADMODES bits for R29.

c) SWINIT +3 was changed not to set NOR29FLG.

d) A check whether R29 was running was removed from RDRUSECK
in extended verbs.

e) The actual R29 coding was deleted, freeing 334 words in four
fixed banks.

f) P12 was changed to not initialize RADMODES for R29 and to
not zero TKKMKCNT (formerly done to show that R29 downlink
data wasn't ready).

g) A check in ascent guidance to see whether we are in P12 or in
an abort program, and the clearing of NOR29FLG to activate R29
if we are in P12, were deleted.

h) AVGEND was changed to not shut off R29 when Servicer ends.

i) A tag on an instruction used as a constant by R29 was deleted
in Servicer.

j) The extensive checking at the end of Average G at R29 ? was
deleted.

2) (PCR 821.2) The constant AZO was moved from erasable to fixed memory. AZO is the angle in inertial space, measured in revolutions, of Greenwich at midnight July 1. It is therefore constant for any year.

3) (PCR 942) Landing Radar updates below 50 ft. were inhibited. A number whose value is 50 feet (50 FIXED) is moved to the erasable 50ERASE at the beginning of the P60's. 50ERASE is subtracted from the measured altitude of the LR. If the difference is positive the update is made; otherwise the flag LRINH is set to prevent further updates.

4) (PCR 897) Doppler compensation computation and associated erasables were deleted. The LGC doppler compensation computation was unused but took up storage and execution time.

5) (PCR 945) Bits 13 and 14 of flagword 11 were defined as "landing radar failed reasonability test", altitude and velocity respectively. This was so these error conditions would get on the downlist. HFAILFLG is reset when the altitude fail lamp is turned off; VFAILFLG is reset when the velocity fail lamp is turned off. The bits are set each time the reasonability tests are failed.

6) (PCR 286) Erasable locations for TLAND and RLS were arranged in sequence so that a V71 (contiguous block update) format could be used. To do this RLS was moved from E4 to E5 to share with W matrix immediately preceding TLAND. DLAND was moved from E5 to E4 to make room for RLS. An EBANK setting in Lunar Landing Guidance Equations where DLAND is used was changed to CAF EBANK4. The other erasables affected by this setting are all referenced in interpretive.

7) (PCR 899) TET was substituted into word 76 of the Coast and Align downlist, word 28 of the Lunar Surface Align downlist, and word 95 of the Rendezvous and Prethrust downlist.

8) (PCR 944) X-Pointer input from the CDU's was substituted into word 12 of the Descent and Ascent downlist. LATVEL goes into into 12a and FORVEL into 12b.

9) (ACB L-7) The logic of AOTMARK was cleaned up by the removal of a redundant test for descent bits at SOMEKEY and minor re-arrangement to put branched-to coding in-line.

10) (PCR 874.2) A change was made to Pinball to make possible decimal entries of less than 5 characters. This was done by changing the coding to scale decimal loads after the enter rather than as each keystroke comes in.

11) (Anomaly L-1C-03) A "TC LRPOS 2" in V59, done in the case that we are not in powered descent in P63, was changed to a "TC BANKCALL, CADR LRPOS2." The routine, which is also called (with a BANKCALL) by HIGATJOB in the P63 case, returns via SWRETURN.

12) (Anomaly L-1C-01) A phase change was put into S40.8 to correct faulty restart protection. The coding which subtracts the delta-V increment from V_G could have been executed twice in the case of a restart at the wrong time.

13) (ACB L-11) The landing analog displays were changed to allow LATVEL and FORVEL to be computed by R10 regardless of the MODE SELECT switch positions. They will also be computed in ascent as well as descent. They won't be displayed on the X-pointers unless the mode select switch is in PGNCS and we are in descent, as before. The purpose is to make these values available to N60 at any time. (In ascent or out of PGNCS they are computed only twice a second rather than 4 times a second as they are when in descent and PGNCS.)

14) (ACB L-12) The exit from LONGCALL was changed from "DTCB" to "TCF SUPDXCHZ" so that a high superbank can be called. This exit is the one that transfers control to the long-

call we wished to start when it is time and WAITLIST task GETCADR comes up.

Changes to LUMINARY GSOP:

Section 4 should reflect the changes described above in (1), (4), (13).

Section 2 should reflect the changes described above in (1), (5), (6), (7), (8).